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MEMORANDUM

Engineering Division

To:	Transportation Subcommittee Members - Mayor Esteves and Vice-Mayor Gomez
Through:	Charles Lawson, City Manager
From:	Greg Armendariz, Director of Public Works/City Engineer
By:	Jaime O. Rodriguez Acting Traffic Engineer
Subject:	**Tech Memo – 2006 Traffic Signal Warrant Study Program Study Findings & Recommendations**
Date:	May 23, 2006

Recommendations:
① Approve the 2006 Traffic Signal Warrant Study Program – Study Findings & Recommendations Report
② Direct Staff to Identify Pedestrian Enhancements and Conduct Further Studies at the Escuela Pkwy & Russell Ln and Escuela Pkwy & Washington Dr intersections
③ Continue the Traffic Signal Warrant Program on a 2-Year Cycle

Background:

The City's traffic signal warrant program is used to proactively identify intersections that may be appropriate for the installation of a traffic signal. The last study prepared by the City was in 2003; there were no intersections identified as appropriate for the installation of a traffic signal at that time. The last traffic signal built by the City was at Barber Lane & Bellow Drive and it was identified as appropriate for a traffic signal during the 2000 Traffic Signal Warrant Study program.

19 locations were studied in this year's program. 14 intersections were studied directly by the program and 5 locations were studied as part of Traffic Impact Analysis (TIA) studies completed through Capital Improvement Program (CIP) and developer-funded projects. The locations studied vary in the type of existing traffic controls including no existing controls, STOP-control just the minor street approaches, or STOP-control on all approaches.

This year's program utilized new traffic signal warrant standards from the Manual of Uniform Traffic Control Devices (MUTCD) prepared by the Federal Highway Administration and adopted by Caltrans in 2004. There are 8 traffic signal warrants total.

Installation of a traffic signal should only be considered if the following two conditions are met:

- At least one of the 8 warrants is met or a TIA study identifies a traffic signal as appropriate in anticipation of project/future development impacts, and
- Engineering judgment determines installation is appropriate

To collect the data necessary to evaluate the MUTCD warrants, 12-hour manual turning movement counts are collected. This process involves manually counting the number of vehicles for each approach turning left, proceeding straight or turning right as well collecting the volume of pedestrian and bicycle movements.

The 8 MUTCD traffic signal warrants and a general description of each warrant are provided below:

Warrant 1 – Eight Hour Vehicular Volume
This warrant studies the volume of traffic entering an intersection over an 8-hour period to determine if significant delays are experienced to the minor street.

Warrant 2 – Four-Hour Vehicular Volume
This warrant studies the volume of traffic entering an intersection over a 4-hour period to determine if significant delays are experienced to the minor street.

Warrant 3 – Peak Hour
This warrant is applied only in special cases where a minor street, typically a driveway to an office complex or industrial park, may be experiencing significant delays for at least one-hour during each peak period while trying to enter or exit the minor street.

Warrant 4 – Pedestrian Volume
This warrant studies the volume of pedestrians at an intersection or mid-block location. To be considered met there should be at least 100 pedestrian in a 4-hour period or 190 pedestrians in a one-hour period.

Warrant 5 – School Crossing
This warrant studies the volume of school-aged children crossing at an intersection or mid-block location. To be considered met there should be at least 100 school-aged pedestrians for any two hours of the day.

Warrant 6 – Coordinated Signal System
This warrant studies progression of vehicles through an intersection in relation to existing traffic signals nearby. This subjective warrant is considered met if engineering judgment determines that installing a traffic signal will improve progression through a corridor.

Warrant 7 – Crash Experience
This warrant studies the crash history of an intersection. The warrant is considered met when there are more than five (5) correctible crashes by a traffic signal in a 12-month period.

Warrant 8 – Roadway Network
This warrant studies the existing and future volumes of an intersection. The warrant is considered met if the immediate or projected volumes intersection the intersection is at least 1,000 vehicles for each peak hour of each weekday.

Analysis:

The 14 intersections studied in this year's traffic signal warrant program and their existing controls are provided below in Table 1. The 5 locations studied as part of CIP and developer-funded projects is also included in Table 1.

Table 1: 2006 Traffic Signal Warrant Study Locations & Existing Controls

No	Intersection Name (alphabetical order)	Existing Traffic Controls
City Traffic Signal Warrant Program Study Locations		
1	Abbott Av & Marilynn Dr	All-Way STOP
2	Arizona Av & Dixon Rd	All-Way STOP
3	Arizona Av & Washington Dr	All-Way STOP
4	Calaveras Bl-Calaveras Rd & Evans Rd-Piedmont Rd	All-Way STOP
5	Escuela Pkwy & Russell Ln	STOP Control on Russell Ln
6	Escuela Pkwy & Washington Dr	STOP Control on Escuela Pkwy
7	Hillview Dr & Los Coches St	All-Way STOP
8	Hillview Dr & Yosemite Dr	STOP Control on Hillview
9	Kennedy Dr & N Park Victoria Dr	All-Way STOP
10	Milpitas Blvd & Silverlake Dr	STOP Control on Silverlake Dr
11	Milpitas Blvd & Tramway Dr	STOP Control on Tramway Dr
12	Milpitas Blvd & Wilson Wy	STOP Control on Wilson Wy
13	Mt. Shasta Av & S Park Victoria Dr	STOP Control on Mt. Shasta Av
14	Vista Wy & Yosemite Dr	STOP Control on Vista Wy
CIP & Developer-Funded Traffic Signal Warrant Study Locations		
15	Abel St & K-B Entrance-Post Office	No Existing Controls
16	Calaveras Blvd & Carnegie Dr	No Existing Controls
17	Carlo St & N Main St	All-Way STOP
18	Corning Av & S Main St	STOP Control on Corning Av
19	N Main St & SR237 WB Off-Ramp	STOP Control on SR237 WB Off-Ramp

The 8 MUTCD warrants were performed both manually and using a new traffic signal warrant analysis software, PC-Warrants. Both methods were used to determine the accuracy of the PC-Warrants software. The results for both the manual and software studies were the same and summarized below in Table 2.

The large volumes of vehicles traversing through the intersection are predominantly in the northbound direction coming from Jacklin Rd. A traffic signal at the intersection may cause coordination impacts with the existing Escuela Pkwy & Jacklin Rd traffic signal that result in longer queue's on Jacklin Rd if not properly coordinated.

Escuela Parkway & Washington Dr
The School Crossing warrant is satisfied for this intersection. The warrant is met during the AM-Peak commute hour, 7:00 AM – 8:00 AM, which coincides with the start of school for Pomeroy Elementary School, Russell Middle School, and Milpitas High School located immediately south. Even with the large pedestrian volumes at the intersection, there are no reported crashes in the last 24 months that are correctable by a traffic signal. Like Escuela Parkway & Russell Lane, the City of Milpitas has installed new pedestrian enhancements at and around the intersection including ADA-compliant pedestrian ramps and high-visibility, enhanced crosswalk markings and signs. In addition, crossing guards are present at the intersection during school entry/exit hours.

Both of the above intersections should be studied further as part of Escuela Pkwy corridor improvements to better determine the impacts of installing traffic signals at the intersections. Staff does recommend the installation of pedestrian push-button activated flashing beacons at both intersections for enhanced pedestrian. The flashing beacons are advisory devices to inform motorists of changes in roadway conditions ahead of them which is appropriate during ingress and egress to the schools in the area.

Abel St & K-B/Post Office
Staff has approved the TIA study for the K-B project and supports the installation of a traffic signal to help assign right-of-way at the intersection as vehicular and pedestrian volumes will increase with the completion of the Terra Serena residential developments. Design of this traffic signal is completed and construction is scheduled to begin by the end of 2006.

Calaveras Blvd & Carnegie Dr
Staff has approved the TIA study for the Milpitas Sports Center Improvement projects and the installation of a traffic signal is supported due to planned on-site access improvements. At this time, the Milpitas Sports Center Improvement projects are On-Hold.

N Main St & SR-237 WB Off-Ramp
Installation of a traffic signal at this intersection is recommended by the N Main St streetscape consultant. Design is currently underway and installation will be coordinated with the completion of other projects in the vicinity including the Milpitas Library, East Parking Garage, County Medical Facility, DeVries Senior Housing, and Apton Plaza residential development.

Recommendations:

Further studies at the Escuela Pkwy & Russell Ln and Escuela Pkwy & Washington Dr intersections should be pursued in conjunction with corridor-wide improvements on Escuela Pkwy prior to making a final decision as to whether a traffic signal is appropriate. Grant funding opportunities for studies are available through the Metropolitan Transportation Commission (MTC) – Traffic Engineering Technical Assistance Program (TETAP) and should be pursued by staff to help supplement the required data collection and analysis procedures necessary for a study. Although staff has already implemented various pedestrian enhancement projects along Escuela Pkwy, the installation of pedestrian push-button activated flashing beacons should be pursued to provide additional information to motorists regarding changes in roadway conditions when pedestrians are present.

Given that no other intersections in this study met any of the recommended traffic signal warrants, staff recommends pursuing the continuation of the program on a two-year cycle. This will allow time for further studies at Escuela Pkwy & Russell Ln and Escuela Pkwy & Washington Dr to be completed.

If you have any questions, please contact Jaime O. Rodriguez, Acting Traffic Engineer, at (408) 586-3335.